

ABSTRACT OF THE DISCLOSURE

A fuel processor system capable of circulating fuel processor system gases, such as reformat, anode exhaust, and/or combustor exhaust, through the fuel processor to provide a number of distinct advantages. The fuel processor system having a plurality of fuel cells discharging an H₂-containing anode effluent and an O₂-containing cathode effluent. A fuel processor is also provided for converting a hydrogen-containing fuel to H₂-containing reformat for fueling the plurality of fuel cells. A catalytic combustor is positioned in series downstream from the plurality of fuel cells and a vaporizer reactor is coupled to the catalytic combustor. A bypass passage is finally provided that interconnects an outlet of at least one of the group consisting of the fuel processor, the plurality of fuel cells, the catalytic combustor, and the vaporizer reactor to the inlet of the fuel processor. The bypass passage is operable to circulate a fuel processor system gas to the inlet of the fuel processor.